#### LARC CHARACTER CODES

CONSOLE DECIMAL DISPLAY	NUMERIC ONE DIGIT	ALPHA TWO DIGIT	CONSOLE KEYBOARD
0	11100	15	\
θ	00100	16	
-	- 00010	17	_
0	10000	20	. 0
i	00001	21	1
2	10011	22	2
3	00111	23	3
4	10110	24	4
5	01000	25	5
6	11001	26	6
7	01011	27	7
8	11111	28	8
9	01110	29	9
8	11010	37	
+	10101	80	+
	01101	Illegal	

#### INSTRUCTION WORD FORMAT

т	1	1	A	A	В	В	м	M	м	м	м
'		Ľ	^	^	0	0	141	*	141	**	**

T: 1-9 = TRACING MODE

= NO TRACING MODE

i = INDIRECT ADDRESSING MODE

I: INSTRUCTION DIGITS

A: ARITHMETIC REGISTER ADDRESS

B: INDEX REGISTER ADDRESS

M: STORAGE ADDRESS

### 8666666668

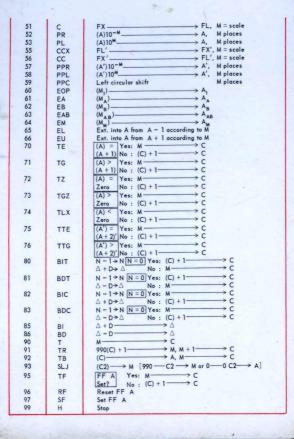
Univac\*
LARC

INSTRUCTION CARDS

### COMPUTING UNIT

00	SKP	Skip	
01	AX	(M) + (A)—	
02	A	(M) (A)	
03	AM	I(M) I (H) (A)	→ A
04	AU	(M) (+) (A)	→ A + 1
0.5	AAX	(M') + (A')	
06	AA	(11') (1) (11')	- A'
09	FV	Lock Yes: (5DD)	A, Reset Lock & Connect
٠,		Set? No : M-	-> C
11	NX	-(M) + (A)	
12	N	-(M) + (A)	
	1275555	-(M) (+) (A)	
14	NU	-(M') + (A')	→ A + I
15	NNX	-(M') + (A')	→ A
16	NN	-(M,) (+) (V,)	→ A'
19	FVK		
		Set? No : M	> C
20	MXR	(M) × (A)Rdd—	→ A
21	MXE	(M) × (A)—	→ A'
22	MR	(M) ⊗ (A)Rdd —	→ A
23	м	(M) (A)	→ A
24	MU	(M) ⊗ (A)———	→ A + 1
25	ME	(M) ⊗ (A)————	→ A'
26	MMX	(M') × (A')———	→ A'
27	MM	(M') ⊗ (A')—	A'
29	SV	Lock Yes: M	
27	34	Set? No : (A)-	- SDD
30	DX	(A) ÷ (M)—	
31	DXE	(A) ÷ (M)	A A + 1 [Bassinder]
		(A) ÷ (M) — — — — — — — — — — — — — — — — — — —	A, A T I [Remainder]
32	DR	(A) (B) (M)Rdd ———————————————————————————————————	→ A
34	DUR	(A) ( (M)Rdd	→ A + 1
35	DDX	(A') ÷ (M')—	→ A
36	DD	(A') ⊕ (M')————	→ A'
37	DSE	(A') (M)———————————————————————————————————	
39	SVK	Lock Yes: M -	
		Set? No : (A)-	
40	S	(A) —	—→ M
41	SN	-(A)	
42	SM	1(A)1	→ M
43	F	(M)	
45	SS	(A')	—→ M'
46	SSN	-(A')	—→ M′
47	SSM	I(A')I	M'
48	FF	(M')	
50	CX	FL	FY M = ecole
30	CA	16	Y I A, M - Scule

# 



#### FLIP-FLOPS

NUMBER	UMBER CONSOLE NAME DESIGNATION			
00-09	0-9	Sense		
10	DIS	Disclosure		
11	IOP	Processor Intervention †		
15	11	Manual and IOP Intervention Inhibit		
20	TM	Enter Tracing Mode‡		
21-29	1-9	Tracing Mode		
30-34	0-4	Computing Unit Manual Intervention t		
38	TAPE	Improper Paper Tape ‡		
39	ADD	Improper Operand †		
40	ZERO	Zero floating point adder result †		
41	DIV	Non-normalized divisor†		
42	EX +	Exponent overflow †		
43	EX.	Exponent underflow †		
44	0F	Fixed decimal overflow†		
45	SGN	Sign anomaly†		
46	STALL	Stall ‡		
47	MISC	Control Error ‡		
48	RES	A-register control error on result time ‡		
49	DEC	Decoding error on tracing digit‡		
50	CALL	B-adder error to memory address decoder ‡		
51	IOE	Instruction error ‡		
52	00E	Operand error ‡		
53	В	A-register error on B-modification ‡		
54	M	A-register error on M-slot ‡		
55	W	A-register error on result time ‡		
56	C1	B-adder error to C1, HSB, or AU‡		
57	IR2	B-adder error to A-storage, A-selector, or M of IR2‡		
58	C2	B-adder error to C2		
59	AB	AB-adder error ‡		

## 

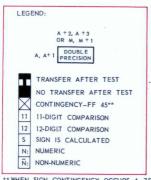
60	AS-	AS-register error ‡
61	COMP	Comparator error ‡
62	QIE	Multiplier, quotient, or extraction error ‡
63	SFC	Shift controls error ‡
64	. OF	Overflow error ‡
65	PC	Program counter or decoding error ‡
66	EP	Ending pulse error ‡
57	AH	AH-register error ‡
68	AD	AD-register error ‡
69	SGN	Sign position error ‡
70	A	A-register error on A-slot ‡
71	1	Digit #1 error
72	2	Digit #2 error
73	3	Digit #3 error
74	4	Digit #4 error
75	5	Digit #5 error
76	6	Digit #6 error
77	7	Digit #7 error
78	8	Digit #8 error
79	9	Digit #9 error
80	10	Digit #10 error
81	11	Digit #11 error
82	12	Digit #12 error
84	CY	Cycling unit error
90	R (on Flex)	Start paper tape
98	Master Check	Master error‡
99	Master Contingency	Master contingency †

NOTE: † Contingency Flip Flop

# Error Flip Flop

#### **RULES FOR SIGN POSITION**

1. STORE INSTRUCTIONS: SM, SN, SSN



		SM
	0	0
	-	0
A		0
	N	0
	N	0

	SN	, SSN*
	0	
	-	0
A		
	N	$\times$
	N	$\times$

<sup>\*\*</sup>WHEN SIGN CONTINGENCY OCCURS A ZERO → S
\*SIGN OF EACH HALF IS HANDLED SEPARATELY.

#### II. EQUALITY & MAGNITUDE TESTS: TE, TTE, TZ, TGZ, TLZ, TG, TTG



TGZ	
	Α
11	0
	-
11.	٠
т	N
$\sim$	N



		Т	G,	TTC + 1	;*.	
-		0	-	•	Ν	Ñ
	0	11	Т	11		X
	-		11			X
A	•	11	Т	11		X
1	N.	П	П	Т	12	X
	N	X	X	X	X	X





#### III. ARITHMETIC INSTRUCTIONS: FIXED AND FLOATING POINT

1. ADD AND SUBTRACT: AX, AM, NX, A, AU, AAX, AA, N, NU, NNX, NA

		1.	AL	י טו	AND	30
			. 1	XX M		
		0	-		N	N
Δ	0	0	5	0	N	X
	-	S	-	-	N	X
^		0	_		N	X
	N	N	N	N	X	X
	Ñ	X	X	X	X	X
			, ,		_	



			N	X		
		0	-		N	Ñ
A	0	5	0	0	N	
	_	-	S	1	N	
		1	0	1	N.	1
	N	N	N	N		1
	N		/	/	/	1

	A	, A	U, /	XAX	, A	A
		0	-		Ň	Ñ
A	0	0	S	0	X	X
	-	S	_	-	X	X
		0	-	٠	X	X
	N	X	X	X	X	X
	Ñ	X	X	X	X	X



2. MULTIPLY AND DIVIDE:

MXR, MXE, MR, M, MU, ME, MMX, MM, DX, DXE, DR, DUR, DDX, DD, DSE

			,	И		
		0	-		N	Ñ
A	0	0	-		X	X
	-	-	0		X	X
					X	X
	N	X	X	X	X	X
	Ñ	X	X	X	X	X